

SMALL BANK IN HOUSE DATA SYSTEM MARKETS

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ANALYSIS OF IN-HOUSE DATA SYSTEMS
MARKETS FOR SMALL COMMERCIAL BANKS

Prepared For:
DATA SYSTEMS DIVISION
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ANALYSIS OF IN-HOUSE DATA SYSTEMS

MARKETS FOR SMALL COMMERCIAL BANKS

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I INTRODUCTION

I INTRODUCTION

- This report evaluates the CYBER 18 as the basis for a bank information processing system and analyzes its market potential, particularly in the area of Small commercial banks.
- The scope of the study was finalized at Data Systems, Control Data Corporation on November 1, 1978.
- The information and forecasts contained in this report were obtained from a synthesis of current INPUT data from the following sources:
 - "Computer Services Markets In Correspondent Banking" (MAS Industry Report No. 13)
 - "Distributed Data Processing Systems: Applications, Performance, and Architecture" (Impact Report #10)
 - "Personal Trust Computer Service" (Custom Study)
 - "MICR Item Processing Systems" (Custom Study)
 - EDP User Panel Questionnaire (30 banks)
 - Small Establishment Survey (33 banks)

- Additional data was obtained by telephone interviews with both equipment vendors and selected Small banks.
- The following definitions of banks by deposit size are used throughout this report:

<u>SIZE</u>	<u>DEPOSITS</u>
Very Large	More than \$1 Billion
Large	\$500M-\$1 Billion
Medium	\$100M-500M
Small	Less than \$100M

- The objectives of the study were:
 - To forecast market potential for the CYBER 18 Bank Information System.
 - To assess the competitive environment with respect to:
 - Hardware vendors.
 - Commercial banks offering correspondent data processing.
 - Computer services vendors offering correspondent data processing.
 - To forecast potential market share.
 - To outline the principal marketing and technical requirements for market entry.
 - To analyze alternative marketing strategies for successful market entry.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. SUMMARY OF RESULTS

- The CYBER 18-20 can be configured to be competitive as a bank retail information system in a limited range of banks; i.e., Small banks having deposits between \$25-100 million and Medium banks having deposits between \$100-300 million. It does not appear that the CYBER 20 can be enhanced to meet the technical requirements for retail bank processing for Medium banks having deposits between \$300-500 million, or for Large banks.
- The CYBER 18-20 cannot be configured to be competitive for Small banks having assets between \$10-25 million. Burroughs and NCR have been successful in selling in-house systems to a limited number (less than 20%) through a combination of small systems integrated with intelligent proof machines which have limited MICR/sort capability.
- The CYBER 18-10 can form the basis of a bank MICR data entry standalone subsystem for Medium banks having deposits between \$300-500 million and Large banks having deposits between \$500 million to \$1 billion.
- The number of Small and Medium banks that could potentially use the CYBER Bank Information System will rise from 2,350 in 1978 to 4,020 by 1984 for an average annual growth rate of 10% in the available market.

- The market potential for the CYBER Bank Information System in terms of annual revenues for in-house host systems will increase from \$283 million per year in 1980 to \$505 million per year in 1984, for an average annual growth rate of 16% (including a 6% annual inflation factor). These revenues are based on all in-house host systems on lease, at a 40 lease to purchase factor (see Exhibit II-1).
- INPUT's estimate of CDC Data Systems Division market share is 2%, or 60 banks by 1980, increasing to 475 banks or 12% of the market by 1984. The estimate assumes CDC will announce the CYBER Bank Information System by fourth quarter 1979, will be ready to hit the street with an effective sales campaign in first quarter 1980, and will be able to make deliveries in second quarter 1980. Gaining 12% of the market by 1984 means that the CDC market share will be one-half that of NCR which holds the lowest share of three vendors (IBM, Burroughs, NCR) presently dividing the targeted market.
- From a revenue standpoint (all systems leased), revenues for installed CYBER Bank Information Systems could rise from \$7 million per year in 1980 to \$62 million per year by 1984. On an if-sold basis, the value of annual shipments will rise from \$18 million in 1980 to \$55 million in 1984, with a cumulative value of all shipments of \$168 million. The forecast assumes first shipments by second quarter 1980, and uses a 6% annual inflation factor.
- The market potential for the CYBER Bank MICR Data Entry Subsystem will increase from 795 units in 1980 to 1,460 units by 1984 for an AAGR of 16% over four years (see Exhibit II-2). The forecast is based on both the growth of Medium and Large commercial banks, a 7.5% annual growth in check volume through 1983, and a 6% growth for 1984.
- INPUT's estimate of market share of the CYBER Bank MICR Data Entry Subsystem is 2%, or 33 units in 1980 rising to 147 units or 10% of the market by 1984. The cumulative value of all shipments through 1984 will be approximately \$29 million. The forecast assumes that CDC Data Systems announces the CYBER Bank MICR Data Entry Subsystem before the announce-

EXHIBIT II-1

FORECAST OF MARKET POTENTIAL AND MARKET SHARE FOR
CYBER BANK INFORMATION SYSTEM

1980 - 1984

BANK DEPOSIT SIZE	1980			1984		
	MARKET POTENTIAL		MARKET SHARE	MARKET POTENTIAL		MARKET SHARE
	NUMBER OF BANKS	ANNUAL REVENUES FROM LEASED INSTALLED BASE (\$M)	NUMBER OF BANKS (SYSTEMS)	ANNUAL REVENUES FROM LEASED INSTALLED BASE (\$M)	NUMBER OF BANKS (SYSTEMS)	ANNUAL REVENUES FROM LEASED INSTALLED BASE (\$M)
MEDIUM \$100-300M	700	\$131	15	\$3	950	\$224
SMALL \$50-100M	730	75	15	2	1,060	138
\$25-50M	1,380	77	30	2	2,010	143
TOTAL	2,810	\$283	60	\$7	4,020	\$505
					475	\$62

EXHIBIT II-2

FORECAST OF MARKET POTENTIAL AND MARKET SHARE FOR CYBER BANK MICR DATA ENTRY SUBSYSTEM

1980 - 1984

BANK DEPOSIT SIZE	1980			1984				
	MARKET POTENTIAL NUMBER OF SUBSYSTEMS	SHIPMENTS OF CYBER SUBSYSTEMS	VALUE OF CYBER SUBSYSTEM SHIPMENTS (\$M)	MARKET POTENTIAL NUMBER OF SUBSYSTEMS	SHIPMENTS OF CYBER SUBSYSTEMS	VALUE OF CYBER SUBSYSTEM SHIPMENTS (\$M)	CUMULATIVE SHIPMENTS OF CYBER SUBSYSTEMS	CUMULATIVE VALUE OF CYBER SUBSYSTEM SHIPMENTS (\$M)
LARGE \$500M - \$1B	585	29	\$5	1,080	20	\$4	108	\$21
MEDIUM \$300M - \$500M	210	4	1	380	6	1	39	8
TOTAL	795	33	\$6	1,460	26	\$5	147	\$29

ment of the CYBER Bank Information System and makes first deliveries by January 1980.

- The CYBER 18-20 is price competitive with Burroughs and NCR minis for small banks; however, the CYBER 18-20 does not now offer the growth potential of the Burroughs and NCR compatible product lines.
- Data Systems' peripheral disks, tapes, and printers are price competitive with comparable Burroughs and NCR products presently offered to small banks.
- Data Systems' MICR sorter readers for small banks hold a significant price performance advantage over those of Burroughs, NCR and IBM.
- The IBM System 8100 and the IBM System/38 both pose a threat. In integrating large capacity disk and diskette with the CPU and significantly lowering the cost of micro-electronic memory, both systems lower the price umbrella for disk and CPU memory. The System 8100 has potential as an on-site system for banks and computer services vendors who have large scale IBM mainframes. The System/38 is a high performance replacement system for the IBM System/3.
- There is a strong trend among banks of all sizes to shift to on-line systems in an attempt to substitute automation for increasing labor costs.
- Of the bank terminals studied, the Incoterm 7000 banking terminal system is modular, competitively priced and meets most of the technical requirements for both branch and unit banks.
- Nothing has occurred in the banking market due either to legislation or technology since INPUT conducted the correspondent banking study (April 1978) to cause INPUT to alter its forecast of the moderate shift to in-house EDP for Small and Medium banks. The shift forecast for the period 1978-1984 comes from a combination of decreasing entry level in-house systems costs and from the increase in formation of multi-bank holding companies.

B. RECOMMENDATIONS

- INPUT cannot make a firm recommendation as to whether or not CDC should develop and market the CYBER Bank Information System without understanding how the product fits with CDC corporate long-range objectives. Given CDC's current size and projected growth, the company's computer related operations should reach at least \$3 billion annually by 1984. Since the CYBER Bank Information System will account for at most \$55 million in annual shipments (if-sold), or \$62 million on an EAR (Equivalent Annual Rental) basis, INPUT feels that there are two reasons for seriously considering the product.
 - The product offering is an integral part of a long-term strategy for CDC to become a major end user supplier to the banking industry.
 - the short-term return of \$168 million (if-sold revenue) over the period 1980-1984 provides sufficient leverage on the present investment plus that required to develop the software and marketing to make an acceptable contribution to corporate profits.
- A decision to enter the in-house system bank market should not be treated lightly. The banking sector is a major EDP market sector, in fact one of the biggest. Banks typically spend between 7% and 9% of their total expenditures on automation. However, the market is controlled by three entrenched competitors who have built up strong customer loyalties over a period of years. To obtain enough market share to interest CDC, a large investment in marketing and image building within the banking industry must be made in addition to product development.
- Given the wherewithal to make that investment, INPUT believes that CDC, of all existing U.S. firms, is most likely to succeed. CDC has adequate hardware, a broad range of peripherals of its own manufacture, superior maintenance facilities (reliability is a key in banking), networking and communications

expertise and some in-house knowledge of the banking industry resident at SBC.

- Should CDC decide to enter the market with the CYBER Bank Information System, INPUT makes the following product recommendations:
 - The CYBER Bank MICR Data Entry System should also be marketed. While the revenues generated from this product will be relatively small (\$29 million over 1980-1984), the additional investment required to build and market the product is also small, and the system extends CDC market coverage.
 - Although the CYBER 20 satisfies the basic requirement for market entry, the system does not offer the upward compatible expansion possibilities of the product lines offered by Burroughs and NCR. CDC should try to enhance the CYBER 18 to provide this upward mobility. Examples of needed features are memory expansion up to 512 KB, a micro-programmed I/O processor, and a dual capacity diskette.
 - CDC will likely have to revise its pricing structure for both RAM and disk memories in order to compete more effectively with the IBM 8100 and System/38.
 - CDC needs a bank terminal subsystem. INPUT recommends (in the short term) acquiring the INCOTERM 7000 and adding to it a program-mable micro-terminal controller and attached diskette. These additions will permit small branches to continue distributed operations when the main branch transaction controller is off-line.
 - INPUT feels that the 979 MICR Sorter/Reader product should be dropped and replaced with a slower speed (600-800 DPM) version of the 9269 under the assumption that this product could be sold for the same price as the 979. CDC would thus have a uniform product line, upwardly expandable in features such as increased speed, microfilming, endorsement, ink jet numbering and more pockets.

- If CDC's decision is to enter the banking sector with the objectives of obtaining a sizable market share long term, future systems should be able to run IBM applications software. This step toward "plug compatibility" will greatly enlarge the available market.
- Beyond the 1983 time frame, the market potential for the CYBER Small Bank Information System, as presently perceived, will drop off sharply. To stay in the business, CDC must have an ongoing product development activity. In particular, product planning must deal with the handling of check truncation.

III STUDY RESULTS

III STUDY RESULTS

A. COMPETITIVE ANALYSIS

I. METHODOLOGY

- The overall objective of the competitive analysis was to determine the segment of the commercial bank marketplace where CDC Data Systems Division could best compete offering the CYBER 18 minicomputer coupled with appropriate peripherals and a CDC MICR sorter reader.
- The analysis was approached by attempting to answer the following questions:
 - "What are the primary hardware requirements to handle the retail processing needs of commercial banks of various deposit size?"
 - "How much are commercial banks of various deposit sizes spending for in-house host data center hardware?"
 - "Where does the CDC CYBER 18 system meet the basic processing requirements in a cost/effective manner?"
 - "How does the configured CYBER Bank Information System compare with competitive systems?"

- From a review of existing respondent data, additional research and vendor contact, processing requirements were determined for handling the retail applications of banks ranging from \$10 million to \$1 billion in deposits (see Exhibit III-1).
- The CYBER 18 specifications indicate that the CYBER 18-20 might fit in Small banks whose deposit size is between \$10-25 million, and that the CYBER 18-20 best fits in Small banks with deposits between \$25-100 million. With some enhancements (memory and I/O), the CYBER 18-20 could fit in Medium sized banks with deposits between \$100-300 million.
- Using a combination of industry and vendor data, INPUT determined commercial bank annual data processing expenditures according to bank deposit size (see Exhibit III-2).
- Average total bank expenditures per bank were calculated from FDIC 1976 reported data indexed by 6% annually to get 1978 expenses. Data on the proportion of total bank expense allocated to bank automation available from American Bankers Association (ABA) and the Bank Automation Institute (BAI) yielded average annual expenditures for automation. Additional ABA and BAI data on the proportion of total automation expenses devoted to host systems (CPU and peripherals) was used to develop average monthly data processing system expenditures. A 40 month factor was used to relate monthly rental to if-sold hardware costs.
- The analysis shows that banks with deposits between \$10 million and \$1 billion have installed host equipment whose average purchase value is between \$84,000 and \$1.45 million per bank.
- INPUT developed typical CYBER Bank Information Systems costs to meet the range of application requirements for each size bank (see Exhibit III-1). The results are presented in Exhibit III-3. The analysis is not intended to be exhaustive. For example, consoles and input/output interfaces were not included. The results do indicate that it does not appear feasible to deliver a

EXHIBIT III-1

RANGE OF RETAIL APPLICATION PROCESSING REQUIREMENTS ACCORDING TO BANK DEPOSIT SIZE

BANK DEPOSIT SIZE	CPU MEMORY (K BYTES)	DISK (MB)	TAPE QUANTITY	PRINTER SPEED		MICR SPEED	
				LPM	QTY	DPM	QTY
LARGE \$500-1B	2,000	1,000	2-4	1,000	2-4	1,000	4-6
MEDIUM \$300-500M \$100-300M	1,000	400	2	1,000	2	1,000	3-4
	512	200	2	1,000	1	1,000	2
SMALL \$50-100M \$25-50M \$10-25M	256	100	2	600	1	800	1
	256	50-100	2	600	1	600	1
	128	25-50	1	300	1	500	1

EXHIBIT III-2

COMMERCIAL BANK ANNUAL DATA PROCESSING
EXPENDITURES ACCORDING TO
BANK DEPOSIT SIZE 1978

BANK DEPOSIT SIZE	AVERAGE TOTAL BANK EXPENSES PER BANK (\$M) (1)	PROPORTION OF BANK AUTOMATED EXPENSES (%) (2)	AVERAGE ANNUAL EXPENDITURE FOR AUTOMATION (\$K)	PROPORTION D.P. HARD- WARE MAIN- FRAME EXPENDITURE (%) (2)	AVERAGE MONTHLY D.P. HARD- WARE EXPENDITURE (\$K)	AVERAGE 40 MONTH PAYOUT INSTALLED HARDWARE COST (\$K)
LARGE \$500M-1B	\$33.5	6.5%	\$2,180	20%	\$36.3	\$1,452
MEDIUM \$300-500M	20.4	7.2	1,470	20	24.5	980
\$100-300M	9.4	8.0	750	22	13.8	552
SMALL \$50-100M	4.3	8.5	370	25	7.7	308
\$25-50M	2.3	8.7	200	27	4.2	168
\$10-25M	1.1	9.0	100	30	2.1	84

(1) FDIC 1976 Annual Report

(2) BAI Survey 1978

EXHIBIT III-3

TYPICAL CYBER BANK INFORMATION SYSTEM COSTS
ACCORDING TO BANK DEPOSIT SIZE

SYSTEM DEVELOPMENT	BANK DEPOSIT SIZE					
	SMALL			MEDIUM		LARGE
	\$10-25M	\$25-50M	\$50-100M	\$100-300M	\$300-500M	\$500-1B
	COST	COST	COST	COST	COST	COST
CYBER 18-10 (128K) 18-20 (256K) 18-20 (512K) 18-20 (1,000K)	\$ 25,700	\$ 39,300	\$39,300	\$65,000(1)	N/A	N/A
DISK 25 MB 50 MB 100 MB 200 MB	25,000	31,100	49,200	98,400		
PRINTER 300 LPM 600 LPM 900 LPM	11,300	18,000	25,000	50,000		
TAPE SINGLE DUAL	10,200	17,900	17,900	17,900		
DISKETTE CONTROLLER DISK 256K 512K	1,500 1,620	1,500 1,620	2,000(1) 3,000(1)	2,000(1) 3,000(1)		
MICR CONTROLLER SORTER READER 979-1 (14) 92690 (14) ENDORSEMENT INK JET NUMBERING MICROFILM	48,000	3,750 45,750	3,750 45,750 4,500 24,750 29,250	7,500 91,500 9,000 49,500 58,500		
TOTAL	\$123,320	\$158,920	\$240,650	\$434,400	-	-

(1) = ESTIMATED

N/A = NOT APPLICABLE

CYBER Small Bank Information System below \$90,000, eliminating Small banks with deposits under \$10 million from consideration.

- The CYBER 18-20 remains competitive at the lower end of Medium banks having deposits of between \$100-300 million. Enhancements in the areas of increased memory capacity (512K) and improved input/output (micro communication processor) will be required to simultaneously handle the teller network, processing and on-line MICR data capture.
- It is difficult to see how the CYBER 18-20 can be enhanced to provide the horsepower to support retail bank operations for banks whose deposits exceed \$300 million. An installed host valued at \$980,000 has more horsepower than the CYBER 18-20 can provide.
- INPUT concludes that the CDC CYBER Bank Information System can be marketed to Small banks having deposits between \$25 million and \$100 million, and to Medium sized banks having deposits between \$100-300 million (upper limit is probably closer to \$200 million).
- For Medium sized banks having deposits between \$300 and \$500 million and for Large banks (deposits between \$500 million to \$1 billion) CDC could market a CYBER Bank MICR Data Entry Subsystem consisting of a CYBER 18-10 and the CDC 92690 MICR sorter/reader (see Exhibit III-4). Data entry as well as MICR reject re-entry can be offered as an option to banks (including multi-bank holding companies) having satellite MICR data capture centers. A separate market analysis was developed for this alternative in Section III B.

2. MAINFRAME VENDORS

- Three vendors (IBM, Burroughs, and NCR) divide the in-house market for Small to Medium sized banks (see Exhibit III-5). Honeywell gives little indication that they are interested in enlarging their dwindling (2%) base which resulted from their acquisition of the GE computer division.

EXHIBIT III-4

CYBER BANK MICR DATA ENTRY
SUBSYSTEM
CONFIGURATION AND COST

COMPONENT	AMOUNT
CDC 18-10 CPU (128K)	\$25,700
DISK 25 MB	24,000
PRINTER 600 lpm	18,000
92690 SORTER/READER 4 POCKETS	37,500
20 POCKETS	16,500
INK JET NUMBERING	24,750
MICROFILM UNIT	29,250
ENDORSEMENT	4,500
CONTROLLER	3,750
TOTAL	\$ 183,950

EXHIBIT III-5

VENDOR IN-HOUSE MARKET SHARE ACCORDING TO BANK DEPOSIT SIZE 1976

BANK DEPOSIT SIZE	IBM (%)	BURROUGHS (%)	NCR (%)	OTHER (%)
MEDIUM \$100-300M	43%	30%	25%	2%
SMALL \$50-100M	38	30	26	6
\$25-50M	42	30	26	2

- From a combination of available data and additional user and vendor interviews, a summary of typical competitive in-house mainframes for each bank deposit size was developed (see Exhibit III-6). Both Burroughs and NCR offer upward migration through a software compatible product line.
- Current IBM mainframes in use by small commercial banks are IBM System 370/125 and IBM System/3. However, INPUT believes that all future installations will be the newly announced IBM System/38, or in the case of multi-bank holding companies, or for correspondent bank data processing on a distributed basis, the IBM System 8100.
- To compare CYBER bank information systems to competition INPUT developed representative competitive equipment prices for the major components of a host system. The data indicates that CDC is price competitive with NCR and Burroughs.
- By lowering the memory and disk price umbrella, IBM System/38 and System 8100 are threats to successful market entry. Fortunately, both systems have a long first system delivery schedule (late 1979). The initial System/38 announcement indicates that IBM will concentrate marketing on the manufacturing and distribution sectors initially.
- The CDC 18-10 holds its own against the Burroughs B80 and NCR I-8250, but the CYBER 18-20 is more competitive than Burroughs and NCR mainframes (see Exhibit III-7).
- IBM System 38 and System 8100 mainframe prices are deceptive. The System 8100 and System/38 prices include both a 64 mb disk and a 1 mb diskette bundled with the mainframe.
- CDC Data Systems can supply diskette, cartridge, and disk storage in competition with NCR and Burroughs (see Exhibit III-8). However, disk storage offered by IBM for the System 8100 and System 38 are more competitive.

EXHIBIT III-6

TYPICAL COMPETITIVE IN-HOUSE MAINFRAMES
ACCORDING TO BANK DEPOSIT SIZE

BANK DEPOSIT SIZE	MANUFACTURER			
	IBM	BURROUGHS	NCR	CDC DATA SYS. DIV.
LARGE \$500M-1B	370/158	B6800- B4800-	V-8650	-
MEDIUM \$300-500M \$100-300M	370/148	B3800-	I-8570	-
	370/138	B2800-	I-8450	CYBER 18-20
SMALL \$50M-100M \$25M-50M \$10M-25M	SYS38/5	B1830	I-8430	CYBER 18-20
	SYS38/5	B800	I-8250	CYBER 18-20
	SYS38/3	B80	I-8230	-

EXHIBIT III-7

REPRESENTATIVE COMPETITIVE EQUIPMENT PRICES FOR SMALL COMMERCIAL BANKS CENTRAL PROCESSOR

EQUIPMENT COMPONENT	PURCHASE PRICE (\$)			
	CDC	IBM	BURROUGHS	NCR
CENTRAL PROCESSOR				
18-10 (128K) 18-20 (256K)	\$25,700 39,300			
System 38/3 (512K) System 38/5 (512K) 8130 (256K) 8140 (512K)		\$ 42,600 (1) 63,200 (2) 25,400 (3) 46,980 (3)		
B 80 (128K) B 800 (128K) B1830 (256K)			\$ 23,245 46,400 67,292	
I-8250 (128K) I-8430 (128K) I-8450 (256K)				\$ 21,755 71,500 107,950

(1) Includes 64mb disk, and 1mb diskette and 4k control store

(2) Includes 64mb disk, 1mb diskette and 8k control store

(3) Includes 64 mb disk and 1mb diskette

EXHIBIT III-8

REPRESENTATIVE COMPETITIVE EQUIPMENT PRICES FOR
SMALL COMMERCIAL BANKS
DISK STORAGE

EQUIPMENT COMPONENT	PURCHASE PRICE (\$)			
	CDC	IBM	BURROUGHS	NCR
<ul style="list-style-type: none"> DISKETTE CONTROLLER 256K DISKETTE DUAL DISKETTE 1MB DISKETTE 	\$1,500 1,620	\$900 2,880	\$1,875 2,950 5,000	\$1,400 1,950 2,450
<ul style="list-style-type: none"> CARTRIDGE DISKS CONTROLLER 4-4 MB 8-8 MB 	2,500 7,890 10,000		3,500 11,000 13,000	6,750 13,200 26,500
<ul style="list-style-type: none"> DISK STORAGE (1) 25 MB 37 MB 50 MB 60 MB 64 MB 100 MB 130 MB 	25,000 31,100 49,200	16,410 32,820	22,785 25,895 38,000 46,600	41,400 57,200

(1) INCLUDES CONTROLLER

- CDC is more competitive than all three competitors in delivering both high speed printers and magnetic tape (see Exhibit III-9).
- CDC becomes most competitive in the area of MICR sorter readers (see Exhibit III-10). INPUT believes that CDC could widen the competitive margin by reducing the document speed of the 92690 to 800 DPM for small banks rather than by offering two or more different MICR sorter/reader models.

3. BANKING TERMINAL VENDORS

- INPUT considers it essential that CDC Data Systems offer an on-line teller, consumer, and administrative terminal subsystem as part of the CYBER Small Bank Information System.
- The terminal system should be modular; that is, each terminal type has basic features and a group of options that the user can add as additional banking services are offered.
- The terminal system must be able to operate when the host processor is off-line.
- INPUT identified thirteen bank terminal vendors. Basic characteristics of the nine major ones are shown in Exhibit III-11.
- Users have shown a preference for teller terminals that have 480 characters of CRT display. Some users feel that the 120 character NCR display is too limited and not easily readable.
- Most terminal vendors now offer, as options, journal printers, passbook printers, card magnetic stripe readers and pads for customer Personal Identification Numbers (PIN). IBM opposes the PIN concept and Olivetti offers a badge reader for employee file access determination.

EXHIBIT III-9

REPRESENTATIVE COMPETITIVE EQUIPMENT PRICES
FOR SMALL COMMERCIAL BANKS
PRINTER AND MAGNETIC TAPE

EQUIPMENT COMPONENT	PURCHASE PRICE (\$)			
	CDC	IBM	BURROUGHS	NCR
PRINTER				
250 lpm			\$13,400	
300 lpm	\$11,300	\$13,250		\$14,150
600 lpm	18,000	22,000		23,500
750 lpm			35,000	
900 lpm	25,000			27,500
1100 lpm		38,140	38,000	
MAGNETIC TAPE				
800 bpi single	10,200	12,780	10,150	12,600
800 bpi dual	17,900	19,710	18,800	24,750

EXHIBIT III-10

COMPETITIVE MICR ITEM PROCESSING
SYSTEMS FOR SMALL BANKS

MANUFACTURER	MODEL	SPEED DPM	NUMBER OF POCKETS	COST
<u>SORTERS (1)</u> CDC	979-1	800	14	\$ 48,000
CDC	92690	1,200	14	49,500
CDC	92660	800	6	30,000
NCR	675-0101	750	12	58,000
BURROUGHS	9135-1 9135-2	850 850	8 12	56,250 66,700
IBM	1255-2 1255-3	750 750	6 12	49,365 64,035
HONEYWELL	DHU0814	830	14	62,400
<u>MICR DATA ENTRY</u> NCR	7750	125	12	55,575
BURROUGHS	S1600	125-250	12	51,200

(1) Includes Controllers

EXHIBIT III-11

COMPETITIVE TELLER AND ADMINISTRATIVE BANKING TERMINALS

MANUFACTURER	MODEL	TELLER TERMINAL	ADMIN. TERMINAL	ADMIN. PRINTER	MODULAR	MICRO BRANCH CONTROL	MINI SYSTEM CONTROL	DISK / DISKETTE	DISK	MAG TAPE CASSETTE
BUNKER RAMO	BCS 90	J, P, S, I 960 ch	1920ch	-	x		BCS 90 16-64K	292K		
BURROUGHS	TCS 1040	J, P, S, I 480 ch	1920ch	90 cps 300 lpm	x		TCS 1040 16-64K			x
DATASAB	-	J, P, S, I 480 ch	960ch	160 cps	x		5020 8-64K	243K		x
FINANCIAL AUTOMATION	Financial Terminal System	J, P, S, I 480 ch	1920ch	90 cps	x		M6800 32-64K	292K		
IBM	3600 FCS	J, P, S, I 240 ch	1920ch	90 cps 300 lpm	x		3601 / 3602 26-56K	280-560K	5.2- 9.3MB	
INCOTERM	7000	J, P, S, I 480 ch	1920ch	100- 165 cps 90 lpm	x	Terminal Controller	Transaction Controller 16-64K	262-524K		
NCR	2500 Modular Term Sys	J, P, S, I 120 ch	960ch	-	x	2501 Module Controller	2200 48-72K	243K		x
OLIVETTI	-	J, P, S, B 480 ch	1920ch	165 cps 125 lpm			Central Unit 16-48K	285K- 570K	9.8MB	x
TRW	FDS/i	J, P, S, I 480 ch	1920ch	-		Branch Terminal Controller	405 16-64K	265K		

J=Journal Printer, P=Passbook Printer, S=Mag Stripe Reader, I=Pin Pad I.D., B=Badge Reader

- Users prefer administrative terminals with 1,920 character CRTs. Most vendors offer several keyboards with functions expanded over those of the teller terminal.
- The printing requirements for administrative stations vary according to how retail banks handle administrative functions. Most requirements can be handled by single copy 90-125 cps printers. There are some applications such as commercial mortgage loans that require 100 lpm pin fed multiple copy printing at the administrative station.
- There is a strong trend toward modularization in teller and administrative terminal offerings. Formerly, Burroughs and NCR built all the functions including a level of microprocessor intelligence into their terminals. Burroughs' and NCR's most recent announcements are modularized terminal systems with micro processor controllers providing the necessary communications intelligence between the terminal and the host.
- All vendors have shifted to a micro/mini-programmable communication controller to interface the terminal equipment with host systems. Three vendors (including Incoterm) also provide a micro terminal controller for operation in small branches. The micro controller communicates with the main branch mini which interfaces with the host.
- All vendors supply diskettes for attachment to the main branch mini. The diskette holds transaction data and allows distribution of essential teller and administrative operations such as cash control and data for printing. Maintaining storage at the branch level allows the terminal network to continue operating for a period of time (30 minutes to 2 hours) when the host is off-line.
- Some vendors provide cartridge disks or magnetic tape cassettes for increased local storage for main office operations, particularly at larger banks.

- INPUT believes that a microprocessor having diskette capability should be substituted for the Incoterm terminal controller to allow a level of distributed processing at the local branch as well as the main branch (home office) level.

4. BANKS AND COMPUTER SERVICES VENDORS

- The forecast of EDP utilization (in-house EDP or computer services) based on bank deposit size as developed in INPUT's Correspondent Banking Study is shown in Exhibit III-12. The forecast shows a gradual shift to in-house utilization due to the formation of multi-bank holding companies, to technology which lowers the cost of entry level in-house systems, and to the trend to on-line processing.
- As Very Large and Large banks (most of whom use IBM mainframes) shift to distributed processing, they can be expected to offer the IBM 8100 to their correspondents in a configuration whereby most of the day-to-day retail transactions are handled on a local basis leaving the central host to do transit, in-clearings, and ACH processing.
- INPUT does not believe that the introduction of the IBM System 8100 will significantly affect the trend of shifting retail bank data processing in-house during the next 2-4 years.

B. MARKET ANALYSIS

I. ASSUMPTIONS

- The CYBER Small Bank Information System will not directly compete against correspondent bank processing services vendors. INPUT's forecast is based on the growth of in-house EDP systems.

EXHIBIT III-12

FORECAST OF EDP UTILIZATION ACCORDING TO BANK DEPOSIT SIZE
1978-1984

BANK SIZE EDP USAGE		1978				1984					
		SMALL \$10-100M		MEDIUM \$100-500M	LARGE \$500M-1B	VERY LARGE > \$1B	SMALL \$10-100M		MEDIUM \$100-500M	LARGE \$500M-1B	VERY LARGE > \$1B
		<\$10M									
IN-HOUSE EDP	11%	39%	79%	92%	95%	20%	50%	85%	95%	98%	
OUTSIDE SERVICES	59	59	20	8	5	70	50	15	5	2	
NOT AUTOMATED	30	2	1	0	0	10	0	0	0	0	
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

- The average annual growth rate (AAGR) for banks according to deposit size (see Exhibit III-13) will be for the forecast period the same growth rate experienced for the last 15 years.
- The distribution of EDP utilization according to bank size (see Exhibit III-12) will not appreciably change from that determined in INPUT's Correspondent Banking Study during the forecast period.
- Prices for the CYBER Small Bank Information System will be indexed (6%) with the consumer price index over the forecast period.
- A factor of 40 will be used to relate monthly rental to purchase price of the CYBER Small Bank Information System.
- CDC Data Systems will announce the CYBER Small Bank Information System by the last quarter of 1979 and will be ready to mount an effective sales campaign by January 1980.
- CDC Data Systems will announce the CYBER Bank MICR Data Entry Subsystem by the fourth quarter of 1979 and will be ready to ship systems at least by January 1980.

2. MARKET POTENTIAL FOR CYBER SMALL BANK INFORMATION SYSTEMS

- The detailed structure of the commercial bank marketplace is contained in INPUT's study "Computer Services Markets in Correspondent Banking." The structure presented below is extended and amplified to reflect the relationship of the CYBER Small Bank Information System to the marketplace.
- The calculated distribution of the number of commercial banks by deposit size from 1978 to 1984 is shown in Exhibit III-13.
- By applying the distribution of the mode of EDP utilization (in-house EDP or outside services) as shown in Exhibit III-12 for banks of potential interest

EXHIBIT III-13

DISTRIBUTION OF COMMERCIAL BANKS BY SIZE
1978-1984

NUMBER OF BANKS BANK DEPOSIT SIZE	1978	1980	1982	1984	AAGR %
VERY LARGE >\$1B	120	140	180	210	10%
LARGE \$500M-1B	120	140	170	190	8
MEDIUM \$300-500M	110	120	140	160	7
\$100-300M	750	860	980	1,120	7
SMALL \$50-100M	1,575	1,740	1,920	2,110	5
\$25-50M	2,940	3,285	3,630	4,010	5
\$10-25M	5,460	5,995	6,615	7,290	5
<\$10M	4,325	3,320	2,065	810	-
TOTAL	15,400	15,600	15,700	15,900	0.5%

(assets between \$10 million and \$1 billion) a distribution of banks who have in-house EDP was determined (see Exhibit III-14) for the forecast period 1978-1984.

- Using the distribution of banks having in-house EDP (see Exhibit III-14) and their corresponding annual host hardware expenditures (see Exhibit III-2), a forecast of market potential (in terms of lease dollars) was determined (see Exhibit III-15).
- The market potential in terms of number of banks which could install CYBER Bank Information Systems is 2,350 in 1978 and will rise to 4,020 by 1984 for an AAGR of 9%. The banks have assets between \$25 million and \$300 million.
- The market potential in terms of annual revenues from leasing all in-house systems is \$212 million in 1978, rising to \$505 million by 1984, for an AAGR of 16%. The market potential in lease dollars is based on a lease to purchase factor of 40 months.

3. MARKET SHARE FOR CYBER SMALL BANK INFORMATION SYSTEMS

- Three vendors (IBM, Burroughs, and NCR) divide the in-house market for banks having deposits between \$25-300 million (see Exhibit III-5).
- INPUT believes that it will take a major effort on the part of CDC to capture a market share that is half (12%) that of the smallest competitor (NCR) over the 1980-1984 time frame.
- Based on a fourth quarter 1979 announcement with system delivery in the second quarter 1980, INPUT's estimate of CYBER Bank Information System is 2% of the market or 60 systems in 1980, rising to 12% or 475 systems by 1984 (see Exhibit III-16). INPUT believes that the CYBER Small Bank Information System will be most competitive in Small banks having deposits between \$50-100 million. CYBER systems will have the most difficulty competing in \$25-50 million deposit size banks because of the competition from Burroughs and NCR distributed MICR data entry systems.

EXHIBIT III-14
 FORECAST OF BANKS WITH IN-HOUSE EDP
 ACCORDING TO BANK DEPOSIT SIZE
 1978-1984

NUMBER OF BANKS BANK DEPOSIT SIZE	1978	1984	AAGR
LARGE \$500-1B	110	180	9%
MEDIUM \$300-500M	90	140	8%
\$100-300M	590	950	8%
SMALL \$50-100M	610	1060	10%
\$25-50M	1150	2010	10%
\$10-25M	2130	3650	9%
TOTAL	4680	7990	9%

EXHIBIT III-15

FORECAST OF MARKET POTENTIAL IN TERMS OF
LEASE DOLLARS FOR CYBER BANK INFORMATION SYSTEMS
1978-1984

BANK DEPOSIT SIZE	1978			1980			1982			1984		
	NUMBER OF BANKS	ANNUAL D.P. HDWR. EXPEND- ITURES (\$K)	MARKET POTEN- TIAL (\$M) (1)	NUMBER OF BANKS	ANNUAL D.P. HDWR. EXPEND- ITURES (\$K)	MARKET POTEN- TIAL (\$M)	NUMBER OF BANKS	ANNUAL D.P. HDWR. EXPEND- ITURES (\$K)	MARKET POTEN- TIAL (\$M)	NUMBER OF BANKS	ANNUAL D.P. HDWR. EXPEND- ITURES (\$K)	MARKET POTEN- TIAL (\$M)
MEDIUM \$100-300M	590	\$166	\$98	700	\$187	\$131	820	\$210	\$172	950	\$236	\$224
SMALL \$50-100M	610	92	56	730	103	75	870	116	101	1,060	130	138
\$25-50M	1,150	50	58	1,380	56	77	1,630	63	103	2,010	71	143
TOTAL	2,350	-	\$212	2,810	-	\$283	3,320	-	\$376	4,020	-	\$505

(1) BASED ON A LEASE TO PURCHASE FACTOR OF 40 MONTHS.

EXHIBIT III-16

FORECAST OF MARKET SHARE (SYSTEMS) FOR CYBER BANK
INFORMATION SYSTEMS
1980-1984

BANK SIZE (DEPOSITS)	1980				1982				1984			
	MARKET POTEN- TIAL (UNIT)	MARKET SHARE (UNIT)			MARKET POTEN- TIAL (UNIT)	MARKET SHARE (UNIT)			MARKET POTEN- TIAL (UNIT)	MARKET SHARE (UNIT)		
		2%	5%	7%		6%	8%	10%		10%	12%	15%
MEDIUM \$100-300M	700	(15)	35	50	820	(50)	65	80	950	(115)	95	140
SMALL \$50-100M	730	(15)	35	50	870	50	(70)	90	1,060	110	130	(160)
\$25-50M	1,380	(30)	90	100	1,630	(100)	130	160	2,010	(200)	240	300
TOTAL	2,810	60	160	200	3,320	200	265	350	4,020	405	485	600

○ BEST ESTIMATE

- Annual revenues for CYBER Small Bank Information Systems will rise from \$7 million in 1980 to \$62 million in 1984 (see Exhibit III-17). The revenues are based on a lease to purchase factor of 40 months and include an annual price increase of 6% due to inflation.
- Market share in terms of shipments is shown in Exhibit III-18. CDC Data Systems shipments in 1980 are 60 systems valued at \$18 million increasing to 475 units valued at \$168 million.

4. MARKET POTENTIAL FOR CYBER BANK MICR DATA ENTRY SUBSYSTEMS

- CDC Data Systems can increase revenue by marketing the CYBER 18-10 with a CDC 92690 MICR sorter/reader as a standalone MICR/data entry subsystem for Medium to Large banks whose deposits range from \$300 million to \$1 billion. Offering the CYBER Bank MICR Data Entry Subsystem will complement the CYBER Small Bank Information System offering.
- Market potential for standalone MICR data entry subsystems (see Exhibit III-19) is 795 units by 1980, rising to 1,460 units by 1984 for an AAGR of 16%. The forecast accounts for both the growth in the number of banks having deposits between \$300 million and \$1 billion, an annual growth in the number of checks processed of 7.5% through 1983 and 6% in 1984.

5. MARKET SHARE FOR CYBER BANK MICR DATA ENTRY SUBSYSTEMS

- INPUT's best estimate of CDC Data System's market share is 33 systems in 1980, rising to 147 units by 1984 (see Exhibit III-20).
- The market share in terms of shipments is shown in Exhibit III-21. The purchase price of a system was \$184,000 in 1978 and was indexed at a 6% annual rate. Shipments in 1980 are 33, valued at \$6 million. Total shipments of 147 subsystems, valued at \$29 million, are a worthwhile add-on market.

EXHIBIT III-17

FORECAST OF MARKET SHARE IN TERMS OF LEASE DOLLARS FOR
CYBER BANK INFORMATION SYSTEMS
1980-1984

BANK SIZE (DEPOSITS)	1980				1982				1984			
	MARKET POTEN- TIAL	MARKET SHARE (\$M) (1)			MARKET POTEN- TIAL	MARKET SHARE (\$M)			MARKET POTEN- TIAL	MARKET SHARE (\$M)		
		2%	5%	7%		6%	8%	10%		10%	12%	15%
MEDIUM \$100-300M	\$131	3	7	9	172	10	14	17	224	22	27	34
SMALL \$50-100M \$25-50M	75	2	4	5	101	6	8	10	138	14	17	21
	77	2	4	5	103	6	8	10	143	14	17	21
TOTAL	\$283	\$7	\$15	\$19	\$376	\$22	\$30	\$37	\$505	\$50	\$61	\$76

○ BEST ESTIMATE

(1) BASED ON A LEASE TO PURCHASE FACTOR OF 40 MONTHS.

EXHIBIT III-18

FORECAST OF SHIPMENTS (SYSTEMS) FOR CDC CYBER BANK INFORMATION SYSTEMS

1980-1984

BANK SIZE DEPOSITS	1980		1981		1982		1983		1984		TOTAL	
	SHIP- MENTS (NO.)	VALUE (\$M)	SHIP- MENTS (NO.)	VALUE (\$M)	SHIP- MENTS (NO.)	VALUE (\$M)	SHIP- MENTS (NO.)	VALUE (\$M)	SHIP- MENTS (NO.)	VALUE (\$M)	SHIP- MENTS (NO.)	VALUE (\$M)
MEDIUM \$100-300M	15	\$8	15	\$9	20	\$12	30	\$20	35	\$24	115	\$73
SMALL \$50-100M	15	5	25	8	30	10	40	15	50	19	160	57
\$25-50M	30	5	35	6	35	6	45	9	55	12	200	38
TOTAL	60	\$18	75	\$23	85	\$28	115	\$44	140	\$55	475	\$168

EXHIBIT III-19

FORECAST OF MARKET POTENTIAL (UNITS) FOR STANDALONE
MICR DATA ENTRY SUBSYSTEMS

1980 - 1984

BANK DEPOSIT SIZE	1980					1982					1984				
	NUM- BER OF BANKS	PROPOR- TION IN- HOUSE	BANKS IN- HOUSE EDP	MICR SORT- ERS/ BANK	MKT. POTEN- TIAL UNITS	NUM- BER OF BANKS	PROPOR- TION IN- HOUSE	BANKS IN- HOUSE EDP	MICR SORT- ERS/ BANK	MKT. POTEN- TIAL UNITS	NUM- BER OF BANKS	PROPOR- TION IN- HOUSE	BANKS IN- HOUSE EDP	MICR SORT- ERS/ BANK	MKT. POTEN- TIAL UNITS
LARGE \$500M- 1B	140	93%	130	4.5	585	170	94%	160	5.2	830	190	95%	180	6.0	1080
MEDIUM \$300- 500M	120	81%	100	2.1	210	140	83%	120	2.4	290	160	85%	140	2.7	380
TOTAL	260		230		795	310		280		1120	350		320		1460

EXHIBIT III-20

FORECAST OF MARKET SHARE FOR CYBER BANK MICR
DATA ENTRY SUBSYSTEMS
1980 - 1984

BANK DEPOSIT SIZE	1980				1982				1984			
	MAR- KET POTEN- TIAL UNITS	MARKET SHARE (UNITS)			MAR- KET POTEN- TIAL UNITS	MARKET SHARE (UNITS)			MAR- KET POTEN- TIAL UNITS	MARKET SHARE (UNITS)		
		2%	5%	7%		6%	8%	10%		10%	12%	14%
LARGE												
\$500M-1B	585	12	(29)	41	830	49	(66)	83	1080	(108)	130	151
MEDIUM												
\$300-500M	210	(4)	11	15	290	17	(23)	29	386	(39)	46	54
TOTAL	795	16	40	56	1120	66	89	112	1460	147	176	205

○ BEST ESTIMATE

EXHIBIT III-21

FORECAST OF SHIPMENTS OF CYBER BANK MICR DATA ENTRY SUBSYSTEMS

1980 - 1984

BANK DEPOSIT SIZE	1980		1981		1982		1983		1984		TOTAL	
	SHIP- MENTS NO.	VALUE (\$M)	SHIP- MENTS NO.	VALUE (\$M)	SHIP- MENTS NO.	VALUE (\$M)	SHIP- MENTS NO.	VALUE (\$M)	SHIP- MENTS NO.	VALUE (\$M)	SHIP- MENTS NO.	VALUE (\$M)
LARGE												
\$500M-1B	29	\$ 5	17	\$ 3	20	\$ 4	22	\$ 5	20	\$ 4	108	\$21
MEDIUM												
\$300-500M	4	1	9	2	10	2	10	2	6	1	39	8
TOTAL	33	\$6	26	\$5	30	\$6	32	\$7	26	\$5	147	\$29

6. FUTURE MARKET CONDITIONS

- Recent research conducted for CDC Data Systems on MICR item processing systems indicated that bankers expected distributed data processing and less check technology to effect significant changes in the way MICR items are handled in the 1983-1988 time frame. In particular, the respondents felt:
 - Less check technology (EFTS/ACH) and popularized credit transfer systems (pay-by-phone and credit cards) will restrain volume growth 20% by 1988.
 - MICR check truncation will become the dominate method (60%) of item processing by 1988.
 - Consumers will accept country club or similar statements with either check facsimile or 40 characters of payee descriptive notation as part of their monthly statements.
- The study forecast that, by 1983, distributed MICR data entry systems (Burroughs S1600, NCR 7750) will rise to 30% of the units shipped.
- Market potential for both the CYBER Small Bank Information System and the CYBER Bank MICR Data Entry Subsystem will be significantly reduced beyond the 1983 time frame.
- Although the proposed systems give CDC Data Systems a good opportunity for market entry, the systems as constituted will not sustain the captured market share. By offering on-line systems with mini/micro branch communications controllers, CDC Data Systems will have the ability to build distributed retail bank networks. CDC Data Systems must plan to optimize the handling of check truncation when market conditions require its use.

C. CDC CYBER SYSTEM CONFIGURATIONS

1. CDC SMALL BANK INFORMATION SYSTEM BASIC CONFIGURATION

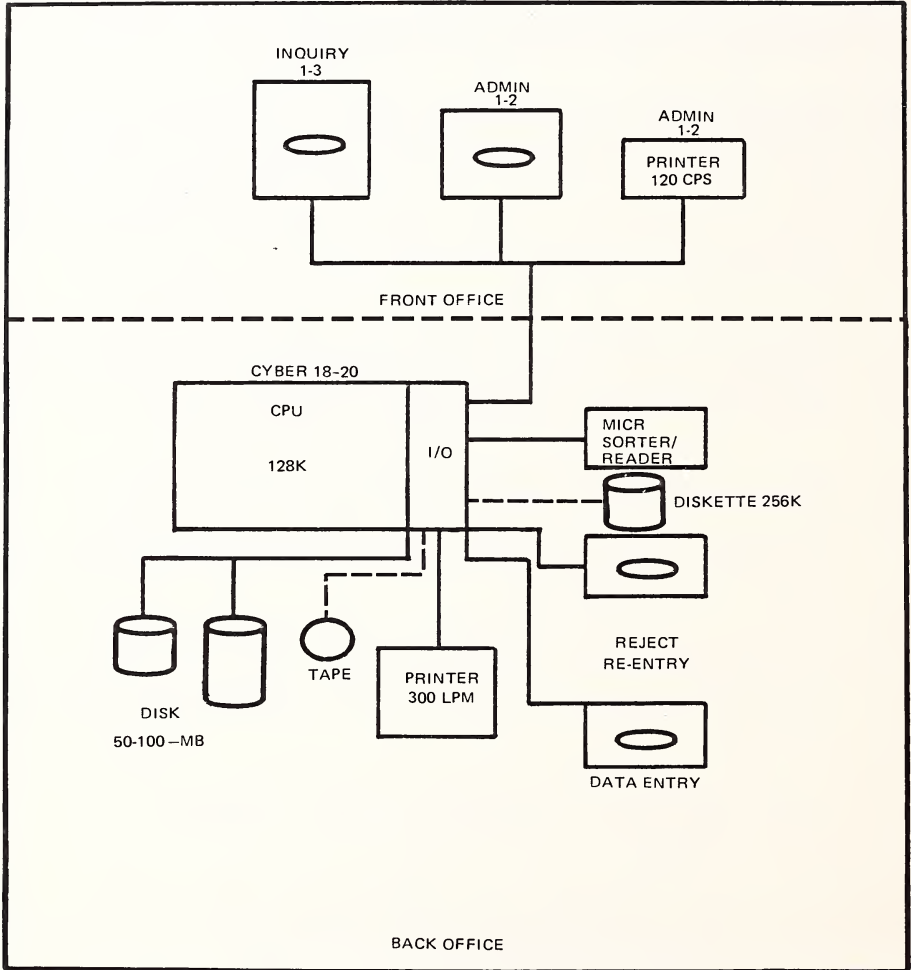
- The entry level system is illustrated in Exhibit III-22.
- The basic configuration is intended for Small banks having deposits between \$25-50 million. On-line capability is limited to CIF/inquiry at teller locations, and inquiry and limited data entry at administrative stations. The on-line network is tied directly into the CYBER 18-20 I/O and is limited to 8-10 terminal units.
- The back office operations are supported by a MICR sorter reader and an on-line reject re-entry system which allows the bank to do full proof and transit functions including proof of deposit and float analysis.
- Single magnetic tape and magnetic diskettes are available options.
- Back office terminals allow on-line data entry, eliminating need for any other vendor key-to-disk equipment.
- On-line functions are limited to data entry MICR data re-entry and CIF/inquiry. The major file management and file updating are accomplished in batch mode.

2. CYBER SMALL BANK INFORMATION SYSTEMS, ENHANCED CONFIGURATION

- An enhanced configuration for unit banks whose deposits run between \$50-100 million is illustrated in Exhibit III-23.

EXHIBIT III-22

CYBER SMALL BANK INFORMATION SYSTEM BASIC CONFIGURATION

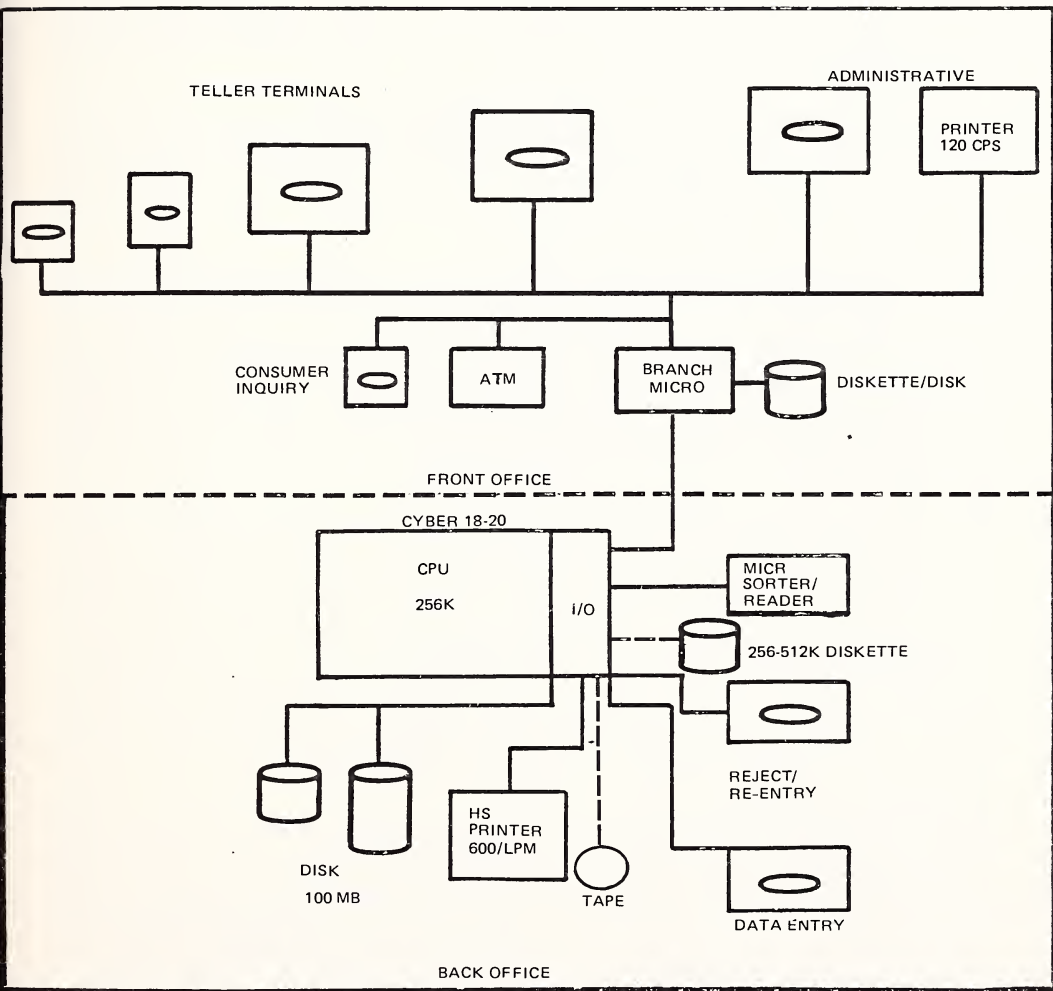


BATCH PROCESSING OF CONSUMER TRANSACTIONS
CENTRAL INFORMATION FILE (CIF)
ON-LINE DATA ENTRY OF NEW ACCOUNTS AND ACCOUNT CHANGES
ON-LINE INQUIRY
ON-LINE REJECT RE-ENTRY

----- OPTION

EXHIBIT III-23

CYBER SMALL BANK INFORMATION SYSTEM ENHANCED CONFIGURATION UNIT BANK

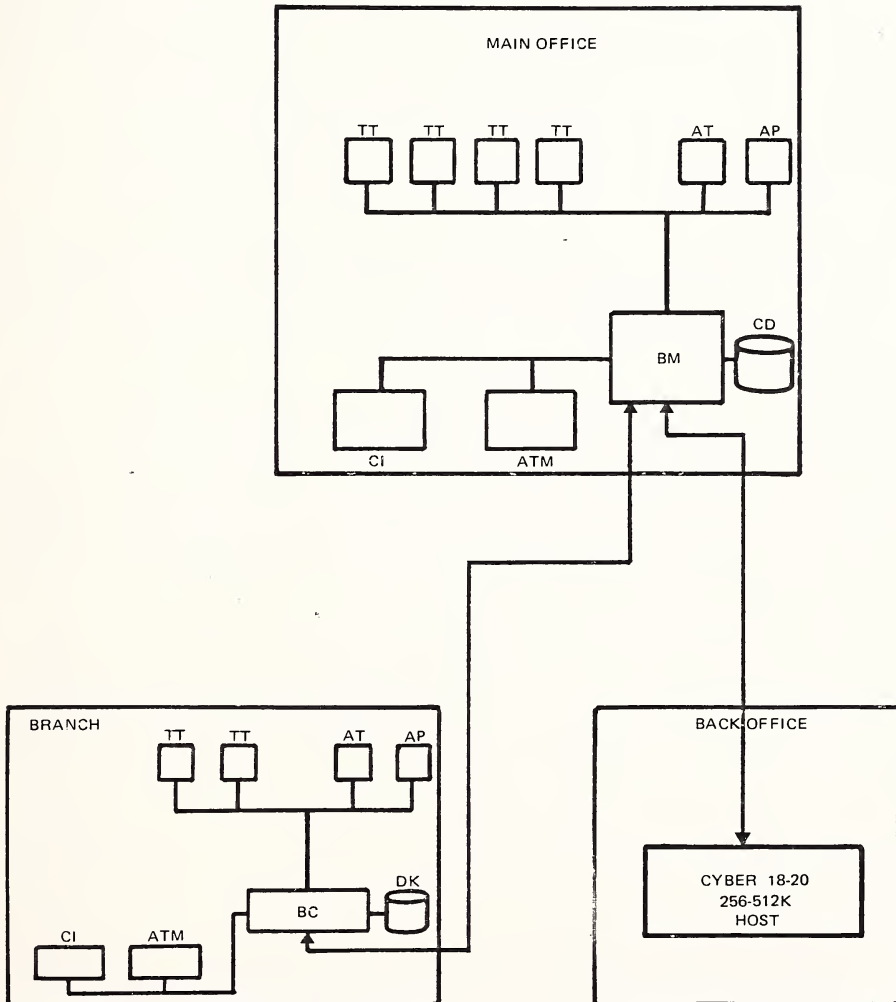


ON-LINE PROCESSING OF "ON-US" CONSUMER TRANSACTIONS
BATCH PROCESSING OF TRANSIT ITEMS AND IN CLEARING ITEMS
CENTRAL INFORMATION FILE
ON-LINE DATA ENTRY OF NEW ACCOUNTS AND ACCOUNT CHANGES
ON-LINE CONSUMER INQUIRY
AUTOMATED TELLER TERMINALS
ON-LINE MICR REJECT RE-ENTRY

----- OPTION

- Teller stations are supported by teller terminals which have as options, journal printers, passbook printers, plastic card magnetic stripe readers and customer PIN pads. The teller terminals allow on-line processing of customer DDA, savings and loan transactions, cash control and automated teller balancing.
- Front office terminals can include consumer inquiry units having magnetic stripe readers, and PIN pads, and ATMs.
- The administrative platform area is supported by administrative terminals that allow for a full range of data entry and customer inquiry, as well as on-line management reporting.
- The bank terminal network is controlled by a front-office microcomputer which accomplishes basic distributed processing. The micro interfaces with and takes the load off the CYBER 18-20 input/output. A diskette or cartridge disk attached to the microcomputer allows the front office network to continue operating when the host is off-line for a period of time (30-90 minutes).
- Back office operations are supported by a MICR data entry and reject re-entry system accomplishing full proof and transit. On-line data entry is an option. Magnetic tape for ACH and for file backup and magnetic diskettes for additional systems control are also options.
- The host system processes all "on-us" transactions on line. Transit and in-clearing items continue to be processed in a batch mode.
- A typical CYBER Bank Information System for Small and Medium sized banks with branches is illustrated in Exhibit III-24. In this configuration the teller network is supported by a micro controller at each branch and a main branch micro/mini communications processor which controls not only the main branch terminals but also the other branch micro controllers.

EXHIBIT III-24
CYBER BANK INFORMATION SYSTEM ENHANCED
CONFIGURATION FOR SMALL-MEDIUM SIZE
BANK WITH BRANCH BANKING



TT – TELLER TERMINALS
 AT – ADMINISTRATIVE TERMINALS
 AP – ADMINISTRATIVE PRINTER
 BM – BRANCH MICRO PROCESSOR
 BC – BRANCH CONTROLLER
 CI – CUSTOMER INQUIRY
 ATM – AUTOMATED TELLER MACHINE
 CD – CARTRIDGE DISK
 DK – DISKETTE

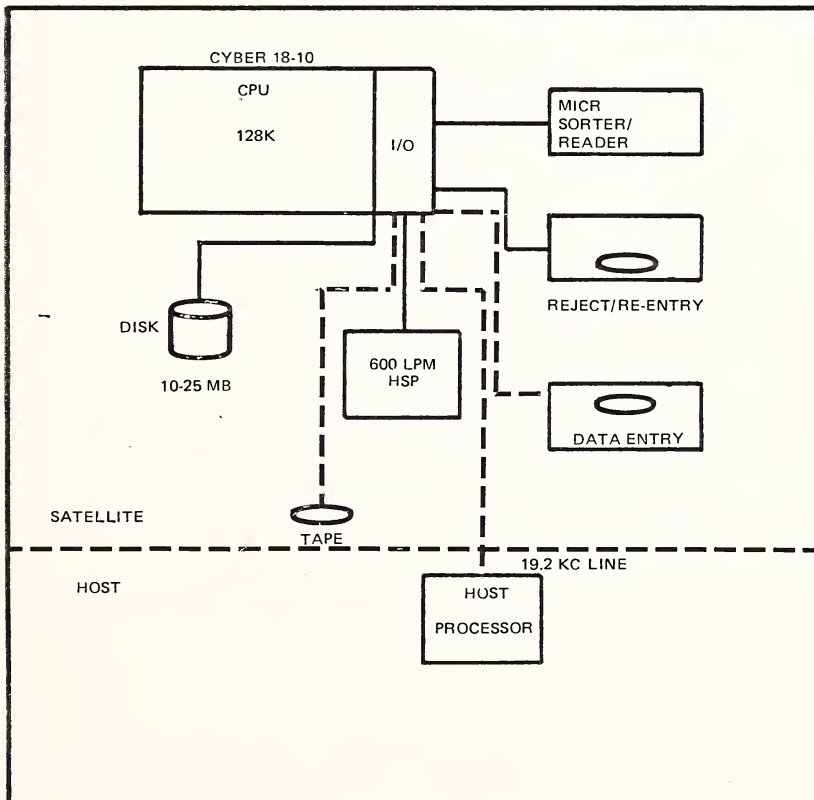
- A diskette unit is attached to each branch micro to support limited distributed operations when the main branch mini is off-line.
- A cartridge disk is integrated with the main branch mini to support inter-branch transactions and limited distributed processing when the host is off-line.
- An administrative line printer with multiple copy capability is an option to produce commercial and mortgage loan documents.
- The CYBER host has additional capability in the I/O (a communications processor) and additional memory (up to 512K) to simultaneously handle the teller network, MICR data capture, MICR reject re-entry and major file processing.

3. CYBER BANK MICR DATA ENTRY SUBSYSTEM CONFIGURATION

- The CYBER Bank MICR Data Entry Subsystem configuration is similar whether located at a satellite center or in proximity of the host (see Exhibit III-25).
- The CYBER 18-10 with 128K of memory is the basis for the standalone system. The 1200 DPM CDC 92690 MICR sorter reader with ink jet endorsement and front end microfilming options is used for MICR data capture.
- Data entry is offered as an option, eliminating other key disk systems, primarily at satellite data capture centers.
- A single magnetic tape for data transfer is an option as is 19.2KC telecommunications transmission capability between the CYBER 18 and an IBM or CDC host.

EXHIBIT III-25

CYBER BANK MICR DATA ENTRY SUBSYSTEM
SATELLITE OR HOST CONFIGURATION
FOR MEDIUM-LARGE SIZE BANK



D. APPLICATIONS ANALYSIS

I. OVERVIEW

- Detailed analysis of retail banking applications was developed in INPUT's study on correspondent banking. The analysis has been revised and expanded to reflect the prime market area for the CYBER Small Bank Information System.
- The application packages that are required to support retail banking are shown in Exhibit III-26. The applications packages are modularized with respect to both operating environment and price. This has been done so that smaller banks that require less hardware and software to get started can expand without reprogramming.
 - The initial operating environment for small banks having assets of \$25-50 million is on-line central information file with inquiry. The DDP, savings and loan applications operate in a batch environment.
- Growth from the basic configuration comes about both through shifting batch applications to on-line and adding applications such as general ledger.

2. CENTRAL INFORMATION FILE (CIF)/INQUIRY

- The central information file (CIF) is a specialized data base with linkages to all other major retail banking files. All accounts can be tied together under a common access number.
- The CIF can access by name or number. If by name, the CIF displays all names close to the name in question to determine the correct access number.
- As an option, the CIF allows any teller transaction to be immediately reflected in the appropriate file.

EXHIBIT III-26

SOFTWARE APPLICATIONS FOR RETAIL BANKING

APPLICATION	MODE	
	ON-LINE	BATCH
- CIF	BASIC	-
- INQUIRY	BASIC	-
- PROOF AND TRANSIT	OPTIONAL	BASIC
- DDA	OPTIONAL	BASIC
- SAVINGS	OPTIONAL	BASIC
- LOAN	OPTIONAL	BASIC
- COMMERCIAL LOAN	OPTIONAL	OPTIONAL
- GENERAL LEDGER	OPTIONAL	OPTIONAL

- On-line account input/correction of the CIF can be accomplished as an option.
- A security system is included as part of the CIF. The system allows different levels of data access for tellers and administrative personnel.
- As an option the CIF allows customer transactions at the teller window or customer inquiry on his account status through a combination of magnetic striped cards and a personal identification number (PIN).

3. PROOF AND TRANSIT

- The enhanced CYBERCAPTURE software, described in INPUT's report on MICR item processing systems, performs all necessary proof and transit functions. It is necessary that the CYBERCAPTURE software operate efficiently in parallel with the on-line teller terminal system and mainline batch processing.

4. DEMAND DEPOSIT ACCOUNTING

- The functions that are part of Demand Deposit Accounting are shown in Exhibit III-27. Indication is given as to most frequent mode of processing and whether the function is offered as basic or as an option. Automatic account transfer and interest determination are new functions required by recent Federal legislation.

5. SAVINGS

- The functions required to serve the savings applications are shown in Exhibit III-28.
- An approach is suggested for offering certain functions as options. Small banks do not have trust departments, hence, do not normally encourage IRA and KEOGH accounts which can require investment advisory services through using Common funds.

EXHIBIT III-27

COMMERCIAL BANK DEMAND DEPOSIT ACCOUNTING
FUNCTIONS ACCORDING TO BANK DEPOSIT SIZE

FUNCTION	BANK SIZE					
	MEDIUM \$100- 300M			SMALL		
				\$50- 100M		
	ON-LINE	BATCH	ON-LINE	BATCH	ON-LINE	BATCH
DEMAND DEPOSIT ACCOUNTING	B	-	O	B	O	B
OVERDRAFT PROTECTION	O	-	O	O	O	O
REVOLVING CREDIT	O	-	O	O	O	O
ACCOUNT RECONCILIATION	O	-	O	O	O	O
STATEMENT PREPARATION	-	B	-	B	-	B
INTEREST CALCULATION	O	-	O	-	O	-
AUTOMATIC ACCOUNT TRANSFER	O	-	O	-	O	-
NOW ACCOUNTING	O	-	O	O	-	-

B = BASIC
O = OPTION
- = NOT USED

EXHIBIT III-28

COMMERCIAL BANK SAVING FUNCTIONS
ACCORDING TO BANK DEPOSIT SIZE

FUNCTION	BANK SIZE						
	MEDIUM \$100- 300M			SMALL			
				\$50-100M		\$25-50M	
	ON-LINE	BATCH	ON-LINE	BATCH	ON-LINE	BATCH	
PASSBOOK SAVINGS	B	-	O	B	O	B	B
TIME DEPOSITS	B	-	O	B	O	B	B
CERTIFICATE OF DEPOSIT	B	-	O	B	O	B	B
CHRISTMAS/ TRAVEL CLUBS	B	-	O	B	O	B	B
IRA AND KEOGH ACCOUNTS	B	-	O	O	-	-	-

B = BASIC
O = OPTION
- = NOT USED

6. LOAN

- The functions that comprise the loan application are shown in Exhibit III-29. Until recently, small banks have not generally offered commercial loans. However, some of the more aggressive and newer banks have been actively pursuing them, suggesting that the commercial loan function should be offered as an option.

7. ADMINISTRATION

- The functions that fall under administration are shown in Exhibit III-30.
- The general ledger (GL) is produced as a by product of processing the DDA, savings and loan applications. The GL program must be able to handle unit banks, branch banks, and multi-bank holding companies.
- Smaller banks are going into full proof of deposit systems with sophisticated float analysis functions to help reduce float and monitor targeted accounts suspected of improper transactions.
- There are a number of management and control reports that are produced as a by-product of daily operations. Some important ones are:
 - Stop payments.
 - Overdrafts.
 - Profitability analyses.
 - Transaction journals.

8. PERSONAL TRUST ACCOUNTING

- Small banks with deposits under \$50 million normally do not offer trust services.

EXHIBIT III-29

COMMERCIAL BANK LOAN FUNCTIONS
ACCORDING TO BANK DEPOSIT SIZE

FUNCTION	BANK SIZE					
	MEDIUM \$100-300M		SMALL			BATCH
			\$50-100M		ON-LINE	
	ON-LINE	BATCH	ON-LINE	BATCH	ON-LINE	BATCH
COMMERCIAL LOANS	O	O	O	O	-	-
PERSONAL LOANS	B	-	O	B	O	B
INSTALLMENT LOANS	B	-	O	B	O	B
MORTGAGE LOANS	B	-	O	O	O	O

B = BASIC
O = OPTION
- = NOT USED

COMMERCIAL BANK ADMINISTRATIVE FUNCTIONS
ACCORDING TO BANK DEPOSIT SIZE

GENERAL LEDGER	BANK SIZE							
	MEDIUM \$100-300M				SMALL			
	\$50-100M		\$25-50M					
	ON-LINE	BATCH	ON-LINE	BATCH	ON-LINE	BATCH	ON-LINE	BATCH
FLOAT ANALYSIS	O	B	O	B	O	B	O	B
AUTOMATED CLEAR- ING HOUSE (ACH)	-	O	-	O	-	O	-	O
MANAGEMENT REPORTS	O	B	O	B	-	B	-	B

B = BASIC
O = OPTION
- = NOT USED

- As Small banks approach \$100 million in deposits they may offer trust services. This is particularly true in rural and suburban areas. Both personal and corporate trust services are usually handled by Medium and Large banks with deposits over \$250 million.
- In-house trust systems for Small to Medium size banks are usually batch oriented. Batch trust operations are not very satisfactory because they require significant manual effort.
- In the last two years, trust services vendors, notably Bradford and SEI, have been offering on-line trust services through remote computing to all size banks. SEI offers their services using a battery of Prime minicomputers.
- Some Large and Very Large banks have dedicated on-line trust systems using IBM 370/148 and larger equipment.
- INPUT believes that CDC Data Systems should avoid getting into in-house personal trust accounting with the CYBER Bank Information System. Personal trust accounting requires specific applicational expertise which is difficult for marketing to acquire.
- INPUT's current work centered about the requirements of the CYBER Bank Information System applied to retail bank operations. Some effort will be spent during the second phase to measure the importance of the trust accounting applications, and if so, detail the requirements and alternative software sources.

9. CREDIT CARD ACCOUNTING

- Small banks with deposits under \$50 million normally offer credit cards such as MasterCharge and Visa on arrangement with a Large bank in their area. The Large bank either does the credit card accounting, or the processing is done by an association formed by member banks. Some of the association's processing is done under facility managers (Tymshare for Western States Bankcard Association (WSBA)).

- Some Small banks with deposits approaching \$100 million and Medium size banks in suburban areas may do their own and local banks credit card processing. INPUT has not yet analyzed the credit card application. Effort will be spent during the second phase to determine the importance of credit card accounting to the CYBER Bank Information System, and if so, detail the requirements and alternative software sources.

E. MARKETING AND TECHNICAL REQUIREMENTS

I. OVERVIEW

- The marketing and technical requirements summary is based on CDC Data Systems marketing the CYBER Bank Information System to Medium and Small banks whose asset size varies between \$25-300 million, and the CYBER Bank MICR Data Entry Subsystem to Medium and Large banks whose assets are between \$300 million and \$1 billion.
- The key question is, "How can CDC make its presence felt in a market shared by IBM, Burroughs and NCR?"
- CDC Data Systems can offer the prospective banker a total solution, equipment that is reliable, competitively priced, fully supported, well maintained, and integrated with the latest on-line software technology.
- CDC is already "there" in banks. CDC supplies both plug compatible peripherals and MICR sorter readers as OEM subsystems. CDC is now adding the central processor and on-line terminals to offer a "total solution" for commercial banks retail operations.

2. MARKETING REQUIREMENTS

- CDC must convince bankers that CDC has viable data systems solutions to their retail bank operations. The best method of convincing them is to

demonstrate the system in operation. This can be accomplished by developing the CYBER Bank Information System in conjunction with a selected small unit bank and a branch bank (Beta Test Sites). The development sites could be selected in collaboration with the selected software systems vendor. Once the system is operational, demonstration sites can be established by extended support to early systems users.

- CDC Data Systems should establish a separate marketing group to sell to financial institutions. The marketing group must be supported by experts (bank operation officers with "hands-on" experience) in banking. The sales force must be thoroughly trained in retail bank operations. For data systems in the \$150,000-350,000 price range, productivity of a well-trained salesman should build to 3-4 systems per year.
- The structure of both the hardware and software should be highly modularized. Bankers from small unit banks must be able to order an entry level system with the ability to upgrade by adding options such as on-line teller terminals or ACH. Large banks must be able to add microfilming, data entry, or to increase pocket size, interface processing without operational disruption.
- Widespread use of the media is a must to raise banker awareness of CDC Data Systems market presence. Special presentations must be made at ABA conferences and at selected state banker associations meetings.
- CDC can capitalize on this perceived weakness by developing an image of reliability supported by superb service.

3. TECHNICAL REQUIREMENTS

a. CYBER Small Bank Information System

(1) Host System

- The CYBER 18-20 with memory capacity of 128-256K will satisfy initial market entry. The memory capacity should be increased to 512K for sale to

Medium sized banks. An IBM compatible design should be considered to ease software compatibility.

- A communications micro processor should be added to the CYBER 18-20 input/output (I/O) system to better handle simultaneous operation of the on-line teller system, the MICR data entry subsystem and mainline batch processing.
- Disk capacity in the range of 50 mb to 200 mb in 50 mb modules will satisfy record storage requirements.
- Magnetic tape may be required as an option. One or two 800 bpi tapes are sufficient. Adequate disk storage may eliminate magnetic tape requirements.
- Printer speed in the 600-1,000 lpm range is required. For Medium banks the option to operate two printers is required.
- An on-line MICR sorter/reader is required. It would be best to offer one model (92690) slowed down to 600-800 dpm for the lower end and operating at 1200 dpm at the upper end. The options of increased speed, microfilming, endorsement, ink jet numbering and increased pocket size could then be offered as growth options to Small to Medium banks.
- A diskette with 256-512K bytes should be offered as an option when magnetic tape is not required. The diskette is useful for such things as sort patterns, data control, system control, and specialized programs.

(2) Front Office Systems

- The orientation of the CYBER Small Bank Information System is on-line. The system offering should be such that the front office network can continue to operate when the host is off-line for short periods of time.

- The Incoterm System 7000 on-line banking terminal system meets all of the front office requirements. It is modular and provides a branch micro controller expandable into a main office communications mini.
- The basic teller terminal has a keyboard and 960 character CRTs. Optional devices are journal printer, passbook document printer, a bank card magnetic stripe reader, and a customer personal identification Number (PIN) pad.
- The administrative terminal consists of a 1,960 character CRT and an expanded keyboard.
- Administrative printers are single copy with speeds of 100-165 cps, and multiple copy with speeds of 90 lpm.
- Automated Teller Machines (ATMs) can be offered as options.
- A microprocessor is used to control on-line terminals at small branches. The controller communicates with the main office transaction controller. The controller should feature a diskette as an option to allow continued branch operations if the main office controller is temporarily down.
- The intelligent transaction controller (mini) handles the teller network and links to the CYBER 20 host. The main office mini has a 64K memory capacity. A dual capacity diskette is attached giving up to 524K of storage for such functions as cash control and electronic journaling.

(3) Software

- The operating system for the CYBER 20 must be able to handle simultaneously the on-line front office transaction system, main line batch operations, and the MICR data capture, proof and transit system.

- An efficient COBOL compiler is required, both for development and installation of the retail banking applications, and for bank use in developing special reports and specialized applications.
- The applications packages for retail banking must be offered on a modularized basis. Software requirements were outlined in Section III D, "Application Analysis."

b. CYBER Bank MICR Data Entry Subsystem

(1) Host System

- The CYBER 18-10 with memory capacity of 128K satisfies processing requirements.
- Disk capacity in the range of 10-25 mb satisfies record storage requirements.
- A single 800 BPU magnetic tape may be required if the subsystem is not linked to a host.
- A printer speed of 600-1000 lpm is required in order to meet processing "window" requirements.
- A communications interface must be offered as an option. Capability to handle 19.2KC bysynchron or SDLC must be provided.

(2) MICR Reader/Sorter

- The CDC 92690 sorter operating at 1200 dpm is competitive in Medium to Large commercial banks.
- A configuration having between 14-30 pockets is needed.
- A first pass rejection rate should be below 2%.

- Character recognition should be offered as an option.
- Microfilming must be offered as an option.
- Impact endorsement and ink jet numbering must be offered as options.

(3) Data Entry/Re-Entry

- From one to eight full-size CRT screens should be offered.
- For data re-entry, 960 character screens are sufficient.
- Data entry should be offered as an option for sale to MICR satellite data centers. Screen size of 960 or 1920 characters should be offered.

(4) Software

- An operating system that can simultaneously handle MICR data capture, MICR re-entry data correction, data entry and data transmission is required.
- Telecommunications processing is needed that can handle CYBER MINI - CYBER MINI and CYBER MINI - host data transmission.
- A screen formatting data control programming system is required to create specialized programs to edit and control MICR and other entered data.
- CYBERCAPTURE software should be enhanced to provide for:
 - Improved float analysis algorithms.
 - Multi-branch/multi-bank capability.
 - Data transmission from disk as well as tape.
 - NOW accounts.

